UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/565,261 | 04/05/2007 | Tao Duan | 14556.0003USWO | 7771 |

23552 7590 04/24/2009

MERCHANT & GOULD PC
P.O. BOX 2903
MINNEAPOLIS, MN 55402-0903

| EXAMINER | |
|---|---|
| JAMA, ISAAK R | |
| ART UNIT | PAPER NUMBER |
| 2617 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 04/24/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/565,261 | DUAN, TAO | |
| | Examiner | Art Unit | |
| | ISAAK R. JAMA | 2617 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *05 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-14 and 16-21* is/are rejected.

7)☒ Claim(s) *8,9 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/09/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

2. Claim 1 is objected to because of the following informalities: Claim 1 recites ".....which is applied to *the TDD* wireless communication....". The phrase "the TDD" lacks antecedent basis, and therefore, appropriate correction is required.

3. Claim 16 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-7, 10-12 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Number 7,352,736 (Saw).

4. Regarding claims 1 and 11, Saw teaches a method and apparatus for repeating wireless signals bidirectionally and synchronously, which is applied to the TDD wireless communication system comprising a base station and a terminal device **[Abstract]**, wherein said method comprises: step A: obtaining synchronization information of said system from wireless signals emitted from said base station **[Column 1, lines 32-37]**; step B: generating reference control signals accurately synchronized with the base station according to the obtained system synchronization information and the system time slot configuration information **[Column4, lines 25-29]**, processing said reference control signals accurately synchronized with the base station respectively to generate a plurality of time sequential control signals to control the uplink RF amplification, the downlink RF amplification and the receiving and transmission respectively, thereby controlling the downlink channel to be closed when uplink channel is open and the uplink channel to be closed when the downlink channel is open, so as to repeat signals

emitted from the uplink/downlink channel between said base station and terminal devices bidirecitonnally and synchronously **[Column 7, lines 10-20]**.

5. Regarding claims 2 and 3, Saw teaches that the generation of reference control signals accurately synchronized with the base station according to the system synchronization information comprises: generating synchronization pulses and activating a timer when obtaining the system synchronization information; the timer activated beginning to time according to the system time slot configuration information and switching the uplink and downlink enable signals based on the timing of the timer, thereby generating reference control signals accurately synchronized with the base station and obtaining the adjustable timing for synchronization from the base station, and calculating the lag timing between the synchronization pulses generated and the synchronization time slot including the synchronization information corresponding to this pulse **[Column 9, lines 44-53]**.

6. Regarding claims 4 and 5, Saw has been discussed above. But Saw does not specifically teach is that the timer times according to said lag timing, the total time of uplink/downlink time slots and the time of the guard time slots $G_{T0}/G_{T1}$ in the time slot configuration, and allows the accurate synchronous reference control signals to switch between the uplink and downlink enable signals after the last transmission data bit in the uplink/downlink time slot **[Column 4, lines 30-50]**.

7. Regarding claims 6, Saw teaches that the method further comprises: synchronizing said timer one time using said synchronization pulses after a

predetermined period to eliminate the accumulated errors of the timer clock **[Column 2, lines 17-30]**.

8. Regarding claims 7, Saw teaches that the sequential control signals are obtained by logically converting and delaying said reference control signals accurately synchronized with the base station **[Column 2, lines 17-22; i.e. the modem demodulates the received signal and detects a boundary of the downlink time slot, which is a switching point for downlink transmission. The modem then determines a switching time of the TDD switch, taking into consideration a signal processing delay time defined by the communication system]**

9. Regarding claims 10, Saw teaches that wherein, said control closing the downlink channel when the uplink channel is open performs as follows: firstly, the downlink RF amplification control signal (PA_EN1) switched into inactive state allows the downlink of power amplification to be close, then the uplink channel is opened and the downlink channel is closed by the receive and transmit control signal (SW), and finally the uplink RF amplification control signal (PA_EN2) switched into active state enables the uplink of the power amplification; and said control closing the uplink channel when the downlink channel is open performs as the following: firstly, the uplink RF amplification control signal (PA_EN2) switched into inactive state allow the uplink of the power amplification to be closed, then the downlink channel is opened and the uplink channel is closed by the receive and transmit control signal (SW), and finally the downlink RF amplification control signal (PA_EN1) which is switched into active state enables the downlink of power amplification **[Columns 3 and 4, lines 65-67 and 2-7**

**respectively; i.e. the synchronization switch opens and closes a signal transmission path (hereinafter referred to a `feedback path`) between the transmitting unit and receiving unit, also under control of the processing unit. Furthermore, the processing unit, preferably a modem, may synchronously control the first switching unit and synchronization switch such that the feedback path is open when an RF signal is being transmitted to the antenna for uplink processing or when an RF signal is being received from the antenna for downlink processing]**.

10. Regarding claims 12, Saw teaches that the frequency selection and bidirection RF amplification circuit comprises: a filter set for filtering wireless signals which are received and repeated by receive and transmit antennas and emitted from terminal devices and the base station so as to obtain RF signals in the desired band and eliminate interfering signals from out bands **[Figure 2, TX and RX filters 30 and 50]**; a receive and transmit switch **[Figure 2, TDD switch 40]** set for controlling receiving and/or transmitting the obtained RF signals in the desired band; a power amplification device for amplifying the obtained RF signals in the desired band to reach a power which is required when these signals are received and transmitted.

11. Regarding claims 17, Saw teaches that the synchronization extraction and control device comprises: a wireless transceiver for receiving wireless signals emitted from the base station and emitting wireless signals to the base station **[Figure 2, # 45]**; a synchronization extraction device for extracting the system synchronization information from wireless signals emitted from the base station; and a sequential control

device for generating control sequence corresponding to signals emitted from the base station and terminal devices based on the system synchronization information to control the frequency selection and bidirection RF amplification circuit **[ Column 5, lines 17-24; i.e. a modem that includes a signal generator and a controller. The signal generator provides a synchronous reference signal input with a certain pattern to the transmitting unit. The controller controls the TDD switch according to the analysis performed by the pattern analyzing unit. The modem may also include a pattern selector to select the certain pattern of the synchronous signal input, for example a periodic or non-periodic signal]**

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 13, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,352,736 (Saw) in view of Examiner's official notice.

12. Regarding claim 13, 14 and 16, Saw teaches that frequency selection and bidirection RF amplification circuit comprises: a first filter **[Figure 2, # 30]**, a second filter **[Figure 2, # 50]**, a first receive and transmit switch **[Figure 2, # 40]**, a second receive and transmit switch **[Figure 2, # 200]**, a power amplification device for uplink signals, and a power amplification device for downlink signals, said first and second

receive and transmit switch being used for opening the uplink channel and closing the downlink channel or for opening the downlink channel and closing the uplink channel under the control of the sequential control signals **[Column 2, lines 33-36]**, the power amplification device for uplink signals and the power amplification device for downlink signals being in on state and in off state respectively under the control of the sequential control signals when the uplink channel is opened, and the power amplification device for uplink signals and the power amplification device for downlink signals being in off state and in on state respectively under the control of the sequential control signals when the downlink channel is opened **[ Column 3, lines 42-45; i.e. The first switching unit switches between the receiving unit (downlink processing) and transmitting unit (uplink processing) under control of the processing unit]**, wherein, for the uplink channel: a wireless signal emitted from terminal devices and received by the receiving antenna for terminal device signals is filtered by the second filter **[Figure 2, # 50]**, then transmitted to the power amplification device for downlink signals through the second receive and transmit switch and amplified, the amplified wireless signal is transmitted to the first filter through the first receive and transmit switch and filtered, next the amplified wireless signal after being filtered is transmitted from the first filter to the receiving antenna for base station signals and emitted to the base station by means of the receiving antenna for base station signals; and for the downlink channel: a wireless signal emitted from the base station and received by the receiving antenna for base station signals is filtered by the first filter, then transmitted to the power amplification device for uplink signals through the first receive and transmit switch and

amplified; the amplified wireless signal is transmitted to the second filter through the second receive and transmit switch and filtered; the second filter transmits the amplified wireless signal after being filtered to terminal devices by means of the receiving antenna for terminal device signals **[Figure 2, Filters 30 and 50]**. But Saw does not specifically disclose a power amplification device for uplink signals, and a power amplification device for downlink signals as well as voltage regulation. The Examiner takes official notice that it is well known in the art of wireless communication apparatus that voltage regulation and power amplification of received and transmitted signals are required in a transceiver in order to control the voltage and to boost the received signal or the signal to be transmitted. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the well known method indicated above into the synchronization system of Saw in order to increase the received or transmitted signal and to control the system voltage.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,352,736 (Saw) in view U.S. Patent Application Publication Number 2005/0213505 (Iochi et al.)

14. Regarding claims 18, Saw has been discussed above. But Saw does not specifically teach is that the sequential control device is further used to emit malfunction monitor signals to the base station by means of the wireless transceiver. Iochi teaches a communication device and data retransmission control method **[Title]**, whereby a communication terminal apparatus, when the reception quality of received data is satisfactory, transmits an ACK (Acknowledgment) signal (i.e. positive acknowledgement

signal) that signifies a successful reception to the base station apparatus. By contrast with this, when the reception quality of the received data is unsatisfactory, the communication terminal apparatus transmits a NACK (Negative Acknowledgment) signal (i.e. negative acknowledgment signal) that signifies a reception failure to the base station apparatus **[Page 1, paragraph 0004]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the method of Iochi into the synchronization system of Saw in order for the base station retransmit the signals.

15. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,352,736 (Saw) in view U.S. Patent Number 6,473,601 (Oda)

16. Regarding claims 19, Saw has been discussed above. But Saw is silent on the transceiver having two receive antennas. Oda teaches a reception diversity control method and a diversity receiver **[Title]**, whereby two separate antennas are used for a receive circuit **[Figure 2, #s $1_1$ and $1_n$]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include antenna configuration of Oda into the synchronization system of Saw in order to utilize a diversity reception control.

17. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,352,736 (Saw) in view U.S. Patent Number 7,386,328 (Umewaka)

18. Regarding claims 20, Saw has been discussed above. But Saw is silent on the transceiver having a third receiving antenna for base station signals for receiving wireless signals emitted from the base station, and a coupler by which wireless signals

are sent to the frequency selection and bidirection RF amplification circuit and the synchronization extraction and control device respectively. Umewaka teaches a receiver having three antennas **[Figure 1, see antennas 12a, 12b and 12c as well as couplers 18, a, b and c]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include antenna configuration of Oda into the synchronization system of Saw in order to execute predetermined processing for a selected signal and to reduce power consumption.

19. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 7,352,736 (Saw) in view U.S. Patent Number 7,349,718 (Murakami)

20. Regarding claims 21, Saw has been discussed above. But Saw does not specifically teach is that the receiving antenna for base station signals and the receiving antenna for terminal devices signals form a receiving and transmitting antenna set. Murakami teaches a portable handset **[Title]**, whereby upper housing accommodates a radio circuit for demodulating the radio signal to obtain a voice signal or the like and modulating voice signal or the like to obtain the radio signal, a radio signal transmitting /receiving antenna , an exclusive radio signal receiving antenna **[Figure 2, #s 7 and 8, column 1, lines 31-35]**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the antenna configuration of Murakami into the system of Saw in order to separate the incoming and outgoing signals.

***Allowable Subject Matter***

24. Claims, 8, 9 and 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

25. Regarding claim 8, the prior art of record fails to teach or even suggest that the logical conversion and delay indicate concretely: delaying the downlink RF amplification control signals, the uplink RF amplification control signals, and the receive and transmit control signals respectively, so that: when switching from the downlink enable to the uplink enable, the downlink RF amplification control signal(PA_EN1) is firstly switched into an inactive state, then the receive and transmit control signal (SW) is switched to allow the uplink channel to be open, and finally the uplink RF amplification control signal (PA_EN2) is switched into an active state; and when switching from the uplink enable to the downlink enable, the uplink RF amplification control signal (PA_EN2) is firstly switched into an inactive state, then the receive and transmit control signal (SW) is switched to allow the downlink channel to be open, and finally the downlink RF amplification control signal (PA_EN1) is switched into active state.

26. Regarding claim 9, by virtue of being dependent on claim 8, claim 9 is also allowable.

27. Regarding claim 15, the prior art of record fails to teach or even suggest that the downlink power amplification device comprises: a first to fourth power amplifier, a first converter, a second converter, a first SAW filter, and a first variable gain regulator, wherein, a signal emitted from the base station is transmitted to the input terminal of the

first power amplifier through the first receive and transmit switch, then amplified by the first power amplifier, and next down-converted to IF signals by the first converter; after being amplified by the second amplifier, IF filtered in the first SAW filter, level-regulated by the first variable gain regulator, amplified by the third amplifier, up-converted to RF signals by the second converter, and amplified by the fourth amplifier, the signal emitted from this base station reach a predetermined level and then transmitted through the second receive and transmit switch; and said uplink power amplification device comprises: a fifth to eighth power amplifier, a third converter, a fourth converter, a second SAW filter, and a second variable gain regulator, wherein a signal emitted from terminal devices is transmitted to the input terminal of the fifth power amplifier through the second receive and transmit switch, then amplified by this power amplifier, and next down-converted to IF signals by the third converter; after being amplified by the sixth amplifier, IF filtered in the second SAW filter, level-regulated by the second variable gain regulator, amplified by the seventh amplifier, up-converted to RF signals by the fourth converter, and amplified by the eighth amplifier, the signal emitted from the terminal devices reaches a predetermined level and then transmitted through the first receive and transmit switch.

## ***Conclusion***

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publication Number 2003/0032423 (Boros et al.) teaches a method and apparatus for determining a calibration function using at least one remote terminal. U.S. Patent Application Publication Number

2002/0001299 (Petch et al.) teaches a method and apparatus for synchronization in a wireless network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ISAAK R. JAMA whose telephone number is (571)270-5887. The examiner can normally be reached on 7:30 - 5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester G. Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/IRJ/

/Lester Kincaid/
Supervisory Patent Examiner, Art Unit 2617